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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/533,607

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Tadashi Ishikawa

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EXAMINER

SHEVIN, MARK L

ART UNIT

PAPER NUMBER

4116

MAIL DATE

DELIVERY MODE

11/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/533,607	Applicant(s) ISHIKAWA ET AL.	
	Examiner Mark L. Shevin	Art Unit 4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/09/2007 and 07/03/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status

1. Claims 1-5, filed 29 April 2005 as part of a preliminary amendment, are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the **second paragraph** of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3 are rejected under 35 U.S.C. 112, *second paragraph*, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 1-3, the claims state "...crystal grains up to a depth or 2 mm or more..." which does not reasonably appraise one of ordinary skill of the metes and bounds of the claim. The depth could be any number as currently claimed.

4. Claims 1-2 are rejected under 35 U.S.C. 112, *second paragraph*, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 1-3, the claims state "...at a depth of $\frac{1}{4}$ of a thickness t from the surface of the steel plate." which does not reasonably appraise one of ordinary skill of the metes and bounds of the claim. The depth could be any number as currently claimed as the claim references $\frac{1}{4}$ of **a thickness** from the surface, this thickness is not specified.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. **Claims 1-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Statnikov (US 6,338,765).

Regarding claims 1 and 2, Statnikov teaches a method of treating welded steel bodies by pulse impact ultrasonic energy (Abstract). Statnikov teaches that his invention introduces pulse wave energy into a metal body's interior structure in such magnitude as to improve the grain structure and the residual stress patterns (column 5, lines 52-62). The effect of this ultrasonic impact treatment on internal microstructure is again recognized in column 6, lines 59 to 67 and column 8, lines 1-20. Statnikov teaches that this ultrasonic impact treatment method is particularly suited to treating welded joints (column 10, lines 17-24). Furthermore, in reference to steels, Statnikov teaches that the ultrasonic impact technique (UIT) "creates a rearrangement submicrostructure of grains in treated

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areas, particularly in ferromagnetic materials.” (column 10, lines 45-57). See also claims 11-13, 34, and 36.

Statnikov does not explicitly teach the application of his ultrasonic vibration tool specifically to heat affected zones formed by “a last pass of a multi-layer welded joint” (claim 1) or a “fillet welded joint” (claim 2) nor does he teach the specifics of the microstructure asserted after the phrase “to thereby make” in claims 1 and 2.

Statnikov teaches the single, main positive step recited as “a method”, which is subjecting a surface of a heat affected zone...to impacts by an ultrasonic vibration tool. As Statnikov teaches the one positive, physical step, in the method of claims 1 and 2, the effects on crystal structure and undercut length must necessarily flow from this action. The Examiner assumes that Statnikov effects microstructure and undercut length (implicitly a defect mentioned in the Abstract, “a void”) as it features the same positive step as the instant claim 1. Both Statnikov and the instant claim have the same basic step of subjecting a welded area to ultrasonic impacts and are thus functional equivalents.

While Statnikov might not teach treatment of the particular type of weld mentioned in claims 1 and 2, it would be readily obvious to one of ordinary skill in the metallurgical arts to modify Statnikov to apply the disclosed method of ultrasonic impact treatment to any type of metal weld joint including fillet and multi-layer weld joints. Applying a known technique (ultrasonic impact treatment) to a different type of weld is within the ability of one of ordinary skill in the art and

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one would have a reasonable expectation of success in improving a given material property such as toughness.

The text following “a method of...” (in both claims 1 and 2) is not given patentably weight as it is intended use that does not specifically limit the structure of the work product produced by the positive step, ultrasonic impacts. Substituting the word “toughness” with “fatigue” (or simply broadening the claim to “improving the mechanical properties”) would in no way change the structure indicated.

Regarding claims 3 and 4, these claims are rejected for the same reasons as claims 1 and 2 in that Statnikov teaches the same positive process step. The prior art performs the same process on the same material, steel, and it is assumed to produce the same results. Discovery of a new property, such as alteration of crystal structure, does not confer patentability. Statnikov and others (see additional relevant art) had been operating on the assumption that improvement in toughness or fatigue was based on residual stresses and strains rather than crystal structure, a claim to a known method of treating welds to form a given microstructure is obvious.

Regarding claim 5, Statnikov teaches that thermal tempering (supplemental heating above and beyond initial welding) is a known process effective for relaxing residual stress and for internally restructuring crystal structure in terms of grain size (column 1, lines 51-54). It would have been obvious to modify Statnikov to implement a supplemental heating step before, during, or even after ultrasonic treatment as Statnikov teaches that this process

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relieves stresses. Furthermore, applying a known technique to new product is well within the reach of one of ordinary skill in the art and as such, one would have a reasonable expectation of success in heating a welded area (heat affected zone) at any time, before or during treatment.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

S. Roy, et al, Fatigue resistance of welded details enhanced by ultrasonic impact treatment (UIT), *International Journal of Fatigue* 25 (2003 [available online 19 September 2003]) 1239-1247.

Roy teaches treating the toe of a welded region with ultrasonic impacts.

E. Statnikov et al, Specification for Weld Toe Improvement by Ultrasonic Impact Treatment, International Institute of Welding, IIW Document XIII-1617-96, 1996.

Teaches more about the specifics of ultrasonic impact treatment including processing parameters

Statnikov (US 6,932,876)

A method of ultrasonically treating metal

Unde (US 6,223,974)

Unde teaches the modification of the microstructure (reduction in grain size) in a welded joint due to ultrasonic energy (Abstract)

1. Claim 1-5 are rejected

2. No claims are allowed

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax

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phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark L Shevin/
Examiner
Art Unit 4116
10-533,607

/Vickie Kim/

Supervisory Patent Examiner, Art Unit 4116